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Research Details :

Research Title : Extractive liquid-liquid spectrophotometric procedure for the determination of thiocyanate ions employing the ion pair reagent amiloride monohydrochloride

Extractive liquid-liquid spectrophotometric procedure for the determination of thiocyanate ions employing the ion pair reagent amiloride monohydrochloride

Descriptipn : An accurate, inexpensive and less laborious liquid-liquid extractive spectrophotometric procedure for the determination of thiocyanate ions in aqueous media has been developed. The method has been based upon the formation of a yellow colored complex ion associate of the ion-pairing reagent 1-(3, 5-dianiino-6-chloropyrazinecarboxyl) guanidine hydrochloride monohydrate, namely amiloride hydrochloride, DPG(+)-Cl⁻ and the thiocyanate ions in aqueous media containing HNO₃ (0.5 mol L⁻¹) and subsequent extraction with 4-methyl-2-pentanone. The absorption electronic spectrum of the ion associate showed one well-defined peak at lambda(max) 366 nm. The stoichiometric mole ratio of DPG(+)-Cl⁻ to the thiocyanate ions is 1:1. The effective molar absorptivity (e) of the ion associate at lambda(max) 366 nm is 1.1 +/- 0.1 x 10⁴ L mol⁻¹ cm⁻¹. The extraction constants (K_d, K_{ex}, and 0) enabled a simple and convenient use of the developed binary ion associate for the extractive spectrophotometric determination of traces of thiocyanate ions in the aqueous media. Beers law and Ringboms plots are obeyed in the concentration range 0.05-10 and 0.1-7 mu g mL⁻¹ of the thiocyanate ions, respectively with a relative standard deviation of +/- 23%. The calculated lower limits of detection (LOD) and quantitation (LOQ) of the developed procedure for the thiocyanate ions were found equal to 0.02 and 0.066 mu g mL⁻¹, respectively. The developed method has been applied for the determination of trace amounts of thicyanate ions in tap-, waste- and natural water samples and compared successfully with the reported methods at the 95% confidence level. The proposed method was also applied successfully for the determination of thiocyanate ions in saliva samples. (C) 2007 Elsevier B.V. All rights reserved.

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